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RAW SEQUENCE LISTING                    DATE: 12/04/2001
PATENT APPLICATION:  US/09/977,034      TIME: 20:08:08

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    Output Set: N:\CRF3\12042001\I977034.raw
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 1 <110> APPLICANT: Lo, Kin-Ming
 2        Sun, Yaping
 3        Gillies, Stephen D.
 4 <120> TITLE OF INVENTION: Expression and Export of Interferon-Alpha Proteins as
 5        Fc Fusion Proteins
 6 <130> FILE REFERENCE: LEX-009
 7 <140> CURRENT APPLICATION NUMBER: 09/977,034
 8 <141> CURRENT FILING DATE: 2001-10-11
 9 <150> PRIOR APPLICATION NUMBER: US/09/575,503
10 <151> PRIOR FILING DATE: 2000-05-19
11 <150> PRIOR APPLICATION NUMBER: US 60/134,895
12 <151> PRIOR FILING DATE: 1999-05-19
13 <160> NUMBER OF SEQ ID NOS: 29
14 <170> SOFTWARE: PatentIn Ver. 2.0
16 <210> SEQ ID NO: 1
17 <211> LENGTH: 498
18 <212> TYPE: DNA
19 <213> ORGANISM: Homo sapiens
20 <220> FEATURE:
21 <221> NAME/KEY: CDS
22 <222> LOCATION: (1)..(498)
23 <223> OTHER INFORMATION: Human IFN alpha DNA sequence
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26      Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile
27       1               5                  10                  15
28      ctc ctg gca caa atg gga aga atc tct cct ttc tcc tgc ctg aag gac    96
29      Leu Leu Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp
30                      20                  25                  30
31      aga cat gac ttt gga ttc ccc cag gag gag ttt gat ggc aac cag ttc   144
32      Arg His Asp Phe Gly Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe
33                  35                  40                  45
34      cag aag gct caa gcc atc cct gtc ctc cat gag atg atc cag cag acc   192
35      Gln Lys Ala Gln Ala Ile Pro Val Leu His Glu Met Ile Gln Gln Thr
36              50                  55                  60
37      ttc aat ctc ttc agc aca aag gac tca tct gct act tgg gaa cag agc   240
38      Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Thr Trp Glu Gln Ser
39       65                  70                  75                  80
40      ctc cta gaa aaa ttt tcc act gaa ctt aac cag cag ctg aat gac ctg   288
41      Leu Leu Glu Lys Phe Ser Thr Glu Leu Asn Gln Gln Leu Asn Asp Leu
42                      85                  90                  95
43      gaa gcc tgc gtg ata cag gag gtt ggg gtg gaa gag act ccc ctg atg   336
44      Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met
45                     100                 105                 110
46      aat gtg gac tcc atc ctg gct gtg aag aaa tac ttc caa aga atc act   384
47      Asn Val Asp Ser Ile Leu Ala Val Lys Lys Tyr Phe Gln Arg Ile Thr
48                     115                 120                 125
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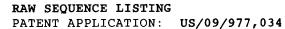
RAW SEQUENCE LISTING   DATE: 12/04/2001
PATENT APPLICATION: US/09/977,034   TIME: 20:08:08

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              Output Set: N:\CRF3\12042001\I977034.raw

49         ctt tat ctg aca gag aag aaa tac agc cct tgt gcc tgg gag gtt gtc    432
50         Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
51             130             135                 140
52         aga gca gaa atc atg aga tcc ttc tct tta tca aaa att ttt caa gaa    480
53         Arg Ala Glu Ile Met Arg Ser Phe Ser Leu Ser Lys Ile Phe Gln Glu
54         145             150                 155                 160
55         aga tta agg aag aag gat                                            498
56         Arg Leu Arg Lys Lys Asp
57                         165
59  <210> SEQ ID NO: 2
60  <211> LENGTH: 166
61  <212> TYPE: PRT
62  <213> ORGANISM: Homo sapiens
63  <400> SEQUENCE: 2
64         Cys Asp Leu Pro Gln Thr His Ser Leu Gly Asn Arg Arg Ala Leu Ile
65          1               5                  10                  15
66         Leu Leu Ala Gln Met Gly Arg Ile Ser Pro Phe Ser Cys Leu Lys Asp
67                         20                  25                  30
68         Arg His Asp Phe Gly Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe
69                     35                  40                  45
70         Gln Lys Ala Gln Ala Ile Pro Val Leu His Glu Met Ile Gln Gln Thr
71              50                  55                  60
72         Phe Asn Leu Phe Ser Thr Lys Asp Ser Ser Ala Thr Trp Glu Gln Ser
73          65                  70                  75                  80
74         Leu Leu Glu Lys Phe Ser Thr Glu Leu Asn Gln Gln Leu Asn Asp Leu
75                         85                  90                  95
76         Glu Ala Cys Val Ile Gln Glu Val Gly Val Glu Glu Thr Pro Leu Met
77                     100                 105                 110
78         Asn Val Asp Ser Ile Leu Ala Val Lys Lys Tyr Phe Gln Arg Ile Thr
79                     115                 120                 125
80         Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
81              130                 135                 140
82         Arg Ala Glu Ile Met Arg Ser Phe Ser Leu Ser Lys Ile Phe Gln Glu
83         145             150                 155                 160
84         Arg Leu Arg Lys Lys Asp
85                         165
87  <210> SEQ ID NO: 3
88  <211> LENGTH: 696
89  <212> TYPE: DNA
90  <213> ORGANISM: Homo sapiens
91  <220> FEATURE:
92  <221> NAME/KEY: CDS
93  <222> LOCATION: (1)..(696)
94  <223> OTHER INFORMATION: Human Fc DNA sequence
95  <400> SEQUENCE: 3
96         gag ccc aaa tct tct gac aaa act cac aca tgc cca ccg tgc cca gca    48
97         Glu Pro Lys Ser Ser Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala
98          1               5                  10                  15
99         cct gaa ctc ctg ggg gga ccg tca gtc ttc ctc ttc ccc cca aaa ccc    96
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              RAW SEQUENCE LISTING              DATE: 12/04/2001
              PATENT APPLICATION:  US/09/977,034    TIME: 20:08:08

                 Input Set : N:\Crf3\RULE60\09977034.raw
                 Output Set: N:\CRF3\12042001\I977034.raw

100        Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro
101                    20                    25                    30
102        aag gac acc ctc atg atc tcc cgg acc cct gag gtc aca tgc gtg gtg    144
103        Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val
104                    35                    40                    45
105        gtg gac gtg agc cac gaa gac cct gag gtc aag ttc aac tgg tac gtg    192
106        Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val
107                    50                    55                    60
108        gac ggc gtg gag gtg cat aat gcc aag aca aag ccg cgg gag gag cag    240
109        Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
110           65                    70                    75                    80
111        tac aac agc acg tac cgt gtg gtc agc gtc ctc acc gtc ctg cac cag    288
112        Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln
113                          85                    90                    95
114        gac tgg ctg aat ggc aag gag tac aag tgc aag gtc tcc aac aaa gcc    336
115        Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala
116                    100                    105                    110
117        ctc cca gcc ccc atc gag aaa acc atc tcc aaa gcc aaa ggg cag ccc    384
118        Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro
119                    115                    120                    125
120        cga gaa cca cag gtg tac acc ctg ccc cca tca cgg gag gag atg acc    432
121        Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr
122                130                    135                    140
123        aag aac cag gtc agc ctg acc tgc ctg gtc aaa ggc ttc tat ccc agc    480
124        Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser
125        145                    150                    155                    160
126        gac atc gcc gtg gag tgg gag agc aat ggg cag ccg gag aac aac tac    528
127        Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr
128                    165                    170                    175
129        aag acc acg cct ccc gtg ctg gac tcc gac ggc tcc ttc ttc ctc tat    576
130        Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr
131                    180                    185                    190
132        agc aag ctc acc gtg gac aag agc agg tgg cag cag ggg aac gtc ttc    624
133        Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe
134                    195                    200                    205
135        tca tgc tcc gtg atg cat gag gct ctg cac aac cac tac acg cag aag    672
136        Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys
137           210                    215                    220
138        agc ctc tcc ctg tcc ccg ggt aaa                                    696
139        Ser Leu Ser Leu Ser Pro Gly Lys
140        225                    230
142 <210> SEQ ID NO: 4
143 <211> LENGTH: 232
144 <212> TYPE: PRT
145 <213> ORGANISM: Homo sapiens
146 <400> SEQUENCE: 4
147        Glu Pro Lys Ser Ser Asp Lys Thr His Thr Cys Pro Pro Cys Pro Ala
148            1                    5                    10                    15
149        Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro
```

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150                     20              25              30
151         Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val
152                 35              40              45
153         Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val
154             50              55              60
155         Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln
156             65              70              75              80
157         Tyr Asn Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln
158                     85              90              95
159         Asp Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala
160                 100             105             110
161         Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro
162             115             120             125
163         Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr
164             130             135             140
165         Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser
166         145             150             155             160
167         Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr
168                 165             170             175
169         Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr
170                 180             185             190
171         Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe
172             195             200             205
173         Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys
174             210             215             220
175         Ser Leu Ser Leu Ser Pro Gly Lys
176         225             230

178 <210> SEQ ID NO: 5
179 <211> LENGTH: 27
180 <212> TYPE: DNA
181 <213> ORGANISM: Homo sapiens
182 <220> FEATURE:
183 <223> OTHER INFORMATION: Forward PCR primer
184 <400> SEQUENCE: 5
185     cccgggtaaa tgtgatctgc ctcagac                              27
187 <210> SEQ ID NO: 6
188 <211> LENGTH: 26
189 <212> TYPE: DNA
190 <213> ORGANISM: Homo sapiens
191 <400> SEQUENCE: 6
192     ctcgagtcaa tccttcctcc ttaatc                               26
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195 <211> LENGTH: 162
196 <212> TYPE: PRT
197 <213> ORGANISM: Homo sapiens
198 <220> FEATURE:
199 <223> OTHER INFORMATION: IFN alpha consensus sequence wherein, Xaa at any
200     position besides positions 24,31,70 and 129
201     represents any amino acid.
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  202 <223> OTHER INFORMATION: Xaa24 can be Ile or Leu, Xaa31 can be Lys or Gln,
  203       Xaa70 can be Thr or Ser and Xaa 129 can be Leu or
  204       Val.
  205 <400> SEQUENCE: 7
W--> 206  Cys Asp Leu Xaa Xaa Xaa Xaa Xaa Leu Xaa Xaa Xaa Xaa Xaa Leu Xaa
  207      1           5               10              15
W--> 208  Xaa Xaa Xaa Xaa Met Xaa Xaa Xaa Ser Pro Xaa Xaa Cys Leu Xaa Xaa
  209              20              25              30
W--> 210  Arg Xaa Asp Phe Xaa Xaa Pro Xaa Glu Xaa Xaa Xaa Xaa Xaa Gln Xaa
  211          35              40              45
W--> 212  Xaa Xaa Xaa Gln Ala Xaa Xaa Val Leu Xaa Xaa Xaa Xaa Gln Gln Xaa
  213          50              55              60
W--> 214  Xaa Xaa Leu Phe Xaa Xaa Xaa Xaa Xaa Ser Ala Xaa Trp Xaa Xaa Thr
  215      65              70              75              80
W--> 216  Leu Leu Xaa Xaa Xaa Xaa Xaa Xaa Leu Xaa Gln Gln Leu Xaa Asp Leu
  217              85              90              95
W--> 218  Xaa Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Leu Xaa
  219          100             105             110
W--> 220  Xaa Val Xaa Xaa Xaa Leu Xaa Val Xaa Xaa Tyr Phe Xaa Xaa Ile Xaa
  221          115             120             125
W--> 222  Xaa Tyr Leu Xaa Xaa Lys Xaa Xaa Ser Xaa Cys Ala Trp Glu Xaa Xaa
  223          130             135             140
W--> 224  Xaa Xaa Xaa Xaa Met Arg Xaa Xaa Ser Xaa Xaa Xaa Xaa Leu Xaa Xaa
  225      145             150             155             160
  226  Arg Leu
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  229 <211> LENGTH: 166
  230 <212> TYPE: PRT
  231 <213> ORGANISM: Homo sapiens
  232 <220> FEATURE:
  233 <223> OTHER INFORMATION: Human IFN alpha-1 protein
  234 <400> SEQUENCE: 8
  235  Cys Asp Leu Pro Glu Thr His Ser Leu Asp Asn Arg Arg Thr Leu Met
  236      1           5               10              15
  237  Leu Leu Ala Gln Met Ser Arg Ile Ser Pro Ser Ser Cys Leu Met Asp
  238              20              25              30
  239  Arg His Asp Phe Gly Phe Pro Gln Glu Glu Phe Asp Gly Asn Gln Phe
  240          35              40              45
  241  Gln Lys Ala Pro Ala Ile Ser Val Leu His Glu Leu Ile Gln Gln Ile
  242          50              55              60
  243  Phe Asn Leu Phe Thr Thr Lys Asp Ser Ser Ala Ala Trp Asp Glu Asp
  244      65              70              75              80
  245  Leu Leu Asp Lys Phe Cys Thr Glu Leu Tyr Gln Gln Leu Asn Asp Leu
  246              85              90              95
  247  Glu Ala Cys Val Met Gln Glu Glu Arg Val Gly Glu Thr Pro Leu Met
  248              100             105             110
  249  Asn Ala Asp Ser Ile Leu Ala Val Lys Lys Tyr Phe Arg Arg Ile Thr
  250          115             120             125
  251  Leu Tyr Leu Thr Glu Lys Lys Tyr Ser Pro Cys Ala Trp Glu Val Val
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VERIFICATION SUMMARY   DATE: 12/04/2001
PATENT APPLICATION: **US/09/977,034**   TIME: 20:08:09

Input Set : **N:\Crf3\RULE60\09977034.raw**
Output Set: **N:\CRF3\12042001\I977034.raw**

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L:206 M:258 W: Mandatory Feature missing, <221> not found for SEQ ID#:7
L:206 M:258 W: Mandatory Feature missing, <222> not found for SEQ ID#:7
L:206 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7
L:208 M:258 W: Mandatory Feature missing, <221> not found for SEQ ID#:7
L:208 M:258 W: Mandatory Feature missing, <222> not found for SEQ ID#:7
L:208 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7
L:210 M:258 W: Mandatory Feature missing, <221> not found for SEQ ID#:7
L:210 M:258 W: Mandatory Feature missing, <222> not found for SEQ ID#:7
L:210 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7
L:212 M:258 W: Mandatory Feature missing, <221> not found for SEQ ID#:7
L:212 M:258 W: Mandatory Feature missing, <222> not found for SEQ ID#:7
L:212 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7
L:214 M:258 W: Mandatory Feature missing, <221> not found for SEQ ID#:7
L:214 M:258 W: Mandatory Feature missing, <222> not found for SEQ ID#:7
L:214 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7
L:216 M:258 W: Mandatory Feature missing, <221> not found for SEQ ID#:7
L:216 M:258 W: Mandatory Feature missing, <222> not found for SEQ ID#:7
L:216 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7
L:218 M:258 W: Mandatory Feature missing, <221> not found for SEQ ID#:7
L:218 M:258 W: Mandatory Feature missing, <222> not found for SEQ ID#:7
L:218 M:341 W: (46) "n" or "Xaa" used, for SEQ ID#:7
L:220 M:258 W: Mandatory Feature missing, <221> not found for SEQ ID#:7
L:220 M:258 W: Mandatory Feature missing, <222> not found for SEQ ID#:7
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L:222 M:258 W: Mandatory Feature missing, <221> not found for SEQ ID#:7
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